

Master Syllabus

1. **COURSE NAME:** Physics I
2. **COURSE PREFIX AND NUMBER:** PHYS 210/2100
3. **COURSE DESCRIPTION:** Provides a fundamental non-calculus course in traditional mechanics topics including mechanical properties of materials, and fluids.
4. **PRE-REQUISITES:** High school physics or PHSC 105 (Elementary Physics).
MATH 111/1110 (Trigonometry) or MATH 129 (Applied Technical Mathematics)
5. **STUDENT COMPETENCIES:** Upon successful completion of this course, the student will be able to:
 1. Solve problems using the metric system, significant figures, and scientific notation.
 2. Distinguish between vector and scalar quantities.
 3. Add and resolve vectors graphically and mathematically to obtain resultants, equilibrants, and components for use in the solution of various general physics problems.
 4. Visualize and solve one-dimensional and two dimensional kinematics problems.
 5. Recognize the basic forces in nature.
 6. Recognize the difference between passive and active forces.
 7. Recognize the difference between contact and non-contact forces.
 8. State and use Newton's three laws of motion.
 9. Solve problems involving the dynamics of uniform circular motion and the underlying principles of centripetal force and acceleration.
 10. State and solve problems using work and energy principles such as, the work-energy theorem, kinetic energy, gravitational potential energy, and the conservation of energy.
 11. Distinguish the difference between conservative and non-conservative forces.
 12. State and use the Impulse-Momentum theorem and the principle of conservation of linear momentum to solve one- and two- dimensional collision problems.
 13. Recognize the relationship between linear and rotational kinematics.
 14. Solve problems using rotational kinematics equations.
 15. Recognize the action of forces and torques on rigid bodies.
 16. Use the principles of translational and rotational equilibrium to solve rotational dynamics problem.

17. Display knowledge of the concepts of angular momentum and rotational work and energy.
18. Solve problems involving angular momentum and rotational work and energy.
19. Display knowledge of the concepts of simple harmonic motion, static equilibrium, and elasticity
20. State and use the principles of fluid mechanics.
21. Understand at a basic level the fundamental principles of Newtonian physics.
22. Solve word problems using the laws of Newtonian physics.
23. Apply problem solving skills acquired through this course to everyday situations.
24. Successfully continue in studies in General Physics II

6. COURSE OUTLINE:

1. Measurement – Scientific notation, factor label method, scientific method, metric scale, SI units and significant figures.
1. Vectors – Vector and scalar quantities, addition and resolution, resultants and equilibrants, choosing axes.
2. Kinematics – One dimensional, two dimensional, and rotational
3. Dynamics – Forces in nature, Newton's laws of motion, conservative and non-conservative forces, rotational systems, and torques
4. Momentum – Momentum and Impulse, Law of Conservation of Momentum, internal and external forces, and elastic and inelastic collisions
5. Energy- Work, power, kinetic energy, potential energy, Law of Conservation of Energy, matter-energy conversions and elastic and inelastic collisions
6. Simple Harmonic Motion
7. Fluids – Pressure, Pascal's Principle, Archimedes' Principle, and Bernoulli's equation.